“Homecoming”

Traumatic Brain Injury & Psychological Health

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Colonel, MC, FS, USA (retired)
Disclosure

The presenter DOES NOT have an interest in selling a technology, program, product, and/or service to CME/CE professionals.
Objectives

1) Improve our understanding of military medicine (Health Services Support Systems)

2) Discuss civil military cooperation in an integrated health services support system

3) Advance our knowledge of traumatic brain injury and strengthen a civil-military coalition of interdisciplinary stakeholders
Restriction Periods

30 Day- a boxer who receives a stunning head blow & demonstrates a lack of normal response

90 Day- a boxer who has been knocked unconscious & is unresponsive to normal stimuli for less than two minutes

180 Day- a boxer who has been knocked unconscious & is unresponsive to normal stimuli for at least two minutes

physician witnessed MOI
300,000 sports-related traumatic brain injuries (TBIs) of mild to moderate severity, most of which can be classified as concussions (i.e., conditions of temporarily altered mental status as a result of head trauma), occur in the United States each year.

### Grading the Severity of Cerebral Concussion

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Grade I (mild)</th>
<th>Grade II (moderate)</th>
<th>Grade III (severe)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-traumatic amnesia</td>
<td>&lt;30 minutes</td>
<td>&gt;30 minutes and &lt;24 hours</td>
<td>&gt;24 hours</td>
</tr>
<tr>
<td>Loss of consciousness</td>
<td>None</td>
<td>&lt;5 minutes</td>
<td>&gt;5 minutes</td>
</tr>
</tbody>
</table>

### Glasgow Coma Scale

<table>
<thead>
<tr>
<th>Eye opening</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>spontaneous</td>
<td>4</td>
</tr>
<tr>
<td>to speech</td>
<td>3</td>
</tr>
<tr>
<td>to pain</td>
<td>2</td>
</tr>
<tr>
<td>no response</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Verbal response</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>alert and oriented</td>
<td>5</td>
</tr>
<tr>
<td>disoriented conversation</td>
<td>4</td>
</tr>
<tr>
<td>speaking but nonsensical</td>
<td>3</td>
</tr>
<tr>
<td>moans/unintelligible sounds</td>
<td>2</td>
</tr>
<tr>
<td>no response</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor response</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>follows commands</td>
<td>6</td>
</tr>
<tr>
<td>localizes pain</td>
<td>5</td>
</tr>
<tr>
<td>withdraws from pain</td>
<td>4</td>
</tr>
<tr>
<td>decorticate flexion</td>
<td>3</td>
</tr>
<tr>
<td>decerebrate extension</td>
<td>2</td>
</tr>
<tr>
<td>no response</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Heegaard WG and Biros MH (see Suggested Reading)
Patient Name: ________________________________

SS#: __________________ Unit: __________________

Date of Injury: _____/____/_____ Time of Injury: ____________

Examiner: ________________________________

Date of Evaluation: _____/____/_____ Time of Evaluation: _____

History: (I – VIII)

I. Description of Incident
   Ask:
   a) What happened?
   b) Tell me what you remember.
   c) Were you dazed, confused, “saw stars”? ☐ Yes ☐ No
   d) Did you hit your head? ☐ Yes ☐ No

II. Cause of Injury (Circle all that apply):
   1) Explosion/Blast   4) Fragment
   2) Blunt object     5) Fall
   3) Motor Vehicle Crash 6) Gunshot wound
   7) Other ______________

III. Was a helmet worn? ☐ Yes ☐ No  Type ______________

IV. Amnesia Before: Are there any events just BEFORE the injury that are not remembered? (Assess for continuous memory prior to injury)
   ☐ Yes ☐ No  If yes, how long __________

V. Amnesia After: Are there any events just AFTER the injuries that are not remembered? (Assess time until continuous memory after the injury)
   ☐ Yes ☐ No  If yes, how long __________

VI. Does the individual report loss of consciousness or “blacking out”? ☐ Yes ☐ No  If yes, how long __________

VII. Did anyone observe a period of loss of consciousness or unresponsiveness? ☐ Yes ☐ No  If yes, how long __________

VIII. Symptoms (circle all that apply)
     1) Headache        2) Dizziness
     3) Memory Problems 4) Balance problems
     5) Nausea/Vomiting 6) Difficulty Concentrating
     7) Irritability    8) Visual Disturbances
     9) Ringing in the ears 10) Other __________

08/2006 DVBIC.org 800-870-9244
This form may be copied for clinical use.
Page 1 of 6
MACE Form B

Due to test-retest issues (e.g. service members memorizing words and numbers) validated, alternative versions B or C should be used.

Immediate Memory
Read all 5 words and ask the patient to recall them in any order. Repeat two more times for a total of three trials. (1 point for each correct, total over 3 trials.)

<table>
<thead>
<tr>
<th>List</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Trial 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candle</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Paper</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Sugar</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Sandwich</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Wagon</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>0</strong></td>
<td><strong>1</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>

Concentration
Reverse Digits: (go to next string length if correct on first trial. Stop if incorrect on both trails.) 1 pt. for each string length.

<table>
<thead>
<tr>
<th>List</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5-2-6</td>
<td>4-1-5</td>
<td>0</td>
</tr>
<tr>
<td>1-7-9-5</td>
<td>4-9-6-8</td>
<td>0</td>
</tr>
<tr>
<td>4-8-5-2-7</td>
<td>6-1-8-4-3</td>
<td>0</td>
</tr>
<tr>
<td>8-3-1-9-6-4</td>
<td>7-2-4-8-5-6</td>
<td>0</td>
</tr>
</tbody>
</table>

Delayed Recall (1 pt each)
Ask the patient to recall the 5 words from the earlier memory test (DO NOT reread the word list.)

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Candle</td>
<td>0</td>
</tr>
<tr>
<td>Paper</td>
<td>0</td>
</tr>
<tr>
<td>Sugar</td>
<td>0</td>
</tr>
<tr>
<td>Sandwich</td>
<td>0</td>
</tr>
<tr>
<td>Wagon</td>
<td>0</td>
</tr>
</tbody>
</table>
Severity Rating for TBI

Traumatic Brain Injury Description

<table>
<thead>
<tr>
<th>Severity</th>
<th>GCS</th>
<th>AOC</th>
<th>LOC</th>
<th>PTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>13-15</td>
<td>≤24 hrs</td>
<td>0-30 min</td>
<td>≤24 hrs</td>
</tr>
<tr>
<td>Moderate</td>
<td>9-12</td>
<td>&gt;24 hrs</td>
<td>&gt;30 min</td>
<td>&gt;24 hrs</td>
</tr>
<tr>
<td>Severe</td>
<td>3-8</td>
<td>&gt;24 hrs</td>
<td>≥24 hrs</td>
<td>≥7 days</td>
</tr>
</tbody>
</table>

GCS- Glasgow Coma Score
AOC- Alteration in consciousness
LOC - Loss of consciousness
PTA- Post-traumatic amnesia
RFI # 1

How would a Civil War Veteran and medical officer like Major Andrew Taylor Still approach blast injury and the nature of man?

Examine the structure & function of the battlefield. Then add time & space.

Then add body, mind and spirit
Dynamics of Disaster
Man Made, Accidental or Natural Critical Incident

Emergency Response → Disaster → Warning → Disaster Preparedness

Reconstruction → Development → Disaster Prevention

Rehabilitation

Odyssey

Iliad

Disaster Mitigation
Pre-deployment Threat Assessment

Preparedness/Deployment Risks

Trauma:

- Blasts
- Penetrating
- Mechanical
- Emotional

Medical
MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (M&RA)
ASSISTANT SECRETARY OF THE NAVY (M&RA)
ASSISTANT SECRETARY OF THE AIR FORCE (M&RA)

SUBJECT: Baseline Pre-deployment Neurocognitive Functional Assessment - Interim Guidance

Commanders and leaders at all levels look to the medical community for additional data to assess a Service member’s ability to return to duty after a brain injury inducing event. Data from a neurocognitive assessment may be used to aid in this determination. To provide the best possible support to our Service members, the Department of Defense is implementing a program to collect baseline neurocognitive data on Active and Reserve Forces before their deployments.

Until ongoing studies to obtain evidence-based outcomes of various neurocognitive assessment tools are completed, the Services will use the Automated Neuropsychological Assessment Metrics (ANAM) to fulfill this requirement. A comprehensive review of available tools has revealed that the ANAM has the best empirical data to support its use in this interim program. Assessments will eventually be implemented when individuals enter the Service, periodically during the Service career, and after any traumatic brain injury.

Effective immediately, begin implementing baseline pre-deployment neurocognitive assessments for your Service members. Within 60 days of the date of this memorandum, your program should ensure that each deploying Service member has received a neurocognitive assessment within 12 months before deployment.

This guidance will be reviewed on a quarterly basis. My point of contact for the Pre-deployment Neurocognitive Assessment program is Ms. Kathy Helmick, Deputy Director for Clinical and Educational Affairs, Defense and Veterans Brain Injury Center, Department of Defense Center of Excellence for Psychological Health and Traumatic Brain Injury, who can be reached at (202) 782-3252 or Katherine.helmick@nta.amedd.mil.

S. Ward Casscells, MD
Care Under Fire

Tactical Field Care

Combat Casualty Evacuation Care

(CASEVAC)
Casualties with an altered mental status should be disarmed immediately.
CASEVAC Care
I. Shock Trauma Platoon

II. FST
Forward Resuscitative Surgery

III. CSH, MSH /// EMEDS + 25 /// Fleet Hospital, Hospital Ship

IV. Field Hospital, General Hospitals

V. Continent of the United States
Navy Fleet Hospitals

Transportable, medically and surgically intensive medical treatment facility

Designed to provide the operational Unified Commander/COCOM medical support during intense combat operations; and protracted low-intensity scenarios (MOOTW)
Patient Movement Aircraft

CH-46
On support ships (AO, AOE)
12 litters plus 2 attendants
100 nm range
100 knots
“Tailored” Medical Care
…with a Building Block Approach

Note: Blending/Overlap of Levels of Care to Capabilities
Emergency  Response = Echelon I-IV

Recovery  = Rehabilitation + Reconstruction

Echelon V = Continent of the United States

Recovery = Echelon V, VI, VII
  Echelon VI = Warrior Transition & Veterans Affairs
  Echelon VII = Community Based Health Care Organization
Mobilization Stressors & Mitigation

Proactive leadership identifies & addresses Service Member & families transition through:

- Pre-deployment
- Deployment
- Post-deployment

[www.pdhealth.mil](http://www.pdhealth.mil)

[www.seamlesstransition.va.gov](http://www.seamlesstransition.va.gov)
Homecoming/ Recovery

Post-deployment Screening:

- Periodic Health Assessments
- Traumatic Brain Injury- [www.dvbic.org](http://www.dvbic.org)

    TBI Screening Tool
    [www.biausa.org](http://www.biausa.org)

- Behavior Health- [www.ncptsd.va.gov](http://www.ncptsd.va.gov)

    PDHA and PDHRA
    [www.behavioralhealth.army.mil](http://www.behavioralhealth.army.mil)
Self

Family

Safety
TBI: Etiology

Civilian population

50% vehicular

20% falls

20% assaults/ violence

10% sports
Differential Diagnosis of Head Injury

- Epidural hematoma
- Subdural hematoma
- Intracerebral hematoma
- Intracerebral contusion
- Subarachnoid hemorrhage
- Cerebral concussion
- Malignant brain edema syndrome
- Second-impact syndrome
- Cervical spine injury

1 A 47-year-old woman presented after hitting the windshield in a motor vehicle accident.
Of the 1.4 million who sustain a TBI each year in the United States:

- 50,000 die;
- 235,000 are hospitalized; and
- 1.1 million are treated and released from an emergency room.
BLASTS

88% Service Members treated at Echelon II in Iraq injured by IED or munitions

Primary- Injuries as a direct result of blast wave-induced changes in atmospheric pressure

Secondary- from objects put in motion by the blast hitting people

Tertiary- by people being forcefully put in motion by the blast wave
MCIs involving bombings & explosions in Madrid, Oklahoma City, Beirut & Belgrade suggest that head injuries including TBI, are among the most common injuries & experienced by 12-33% of injured survivors.

Traumatic Brain Injuries after Mass-Casualty Incidents: Lessons from the 11 September 2001 World Trade Center Attacks

May-June 2007  http://pdm.medicine.wisc.edu
Primary Care Challenges

Requires holistic interdisciplinary approach

Axis I
Clinical Disorders
PTSD
Depressive Disorders
Anxiety Disorders
Substance Use Disorders

Axis II
Personality Disorders

Axis III
General Medical Conditions
TBI
Chronic Pain Syndrome
CV Disease
“Tissue Memory”
OSA

A - Avoidance, Anger, Anxiety, Arousal
N - Numbing
S - hyper arousal to Stimuli, Self medication with alcohol
“The highest officer in command is the artery of nourishment, which must be assisted by the nerve of motion and the vein of renovation.”

Homecoming

Lessons Learned from the Integrative Cardiac Health Project at Walter Reed Army Medical Center

www.ichpcenter.org

Recommend Primary Care Physicians address:

- Cardiac: Risk Assessments / Reduction Plans
- Sleeping for Healthy Heart; improve sleep, improve hypoxia, improve vasodilatation, improve RV output, improve energy/wt loss, IMPROVE Brain & kidney function
- Stress Management, Heart Healthy Eating, Exercising for Life
Integrative Medicine
www.ICHPcenter.org

- Personalized
- Patient Centered
- Multidimensional interventions
- Total Body Model
- Evidenced based
- Connected to acute and chronic care
- Ideally, with feedback, automated prompts and outcomes tracking
Stress Management and Heart Disease

Randomized trial, 107 patients with CHD over 5 years

(Stress management reduced ischemia, less distress/hostility)

“The psychological consequences of disasters have become increasingly clear in recent years. These include post-traumatic stress disorder (PTSD), major depression, anxiety disorders, and substance abuse disorders.”

Anthony T. Ng, M.D.
Alertness  
Awareness  
Anxiety  
PTSD - 309.81  
Duration > 4 wks.

Acute Stress Disorder- 308.3  
Duration 2 days - 4 wks.

Awareness  Behavior

www.ncptsd.va.gov
Public Awareness &

Warnings

Leads to community supported integrated response

EMS/PC/BH

Axis I: PTSD  309.89

1) Trauma event re-experienced
2) Avoidance or numbing
3) Persistent symptoms of increased arousal
4) Duration of disturbance > 1 month
5) Significant distress or impairment
6) Outside the range of human experience
<table>
<thead>
<tr>
<th>Level</th>
<th>Scale</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>No Response</td>
<td>No response to pain, touch, sound, or sight</td>
</tr>
<tr>
<td>II</td>
<td>Generalized Response</td>
<td>Reflex response to pain</td>
</tr>
<tr>
<td>III</td>
<td>Localized Response</td>
<td>Responds to physical discomfort, blinks to strong light, turns toward/away from sound, inconsistent response to commands</td>
</tr>
<tr>
<td>IV</td>
<td>Confused - Agitated</td>
<td>Alert, very active, aggressive or bizarre behaviors, performs motor activities but behavior is non-purposeful, extremely short attention span</td>
</tr>
<tr>
<td>V</td>
<td>Confused - Non-Agitated</td>
<td>Grossly attends to environment, highly distractible, needs continuous re-direction; difficulty learning new tasks; agitated by too much stimulus; May engage in social conversation but with inappropriate wording</td>
</tr>
<tr>
<td>VI</td>
<td>Confused - Appropriate</td>
<td>Inconsistent orientation to time/place; retention span/recent memory impaired; begins to recall past; Consistently follows simple directions</td>
</tr>
<tr>
<td>VII</td>
<td>Automatic - Appropriate</td>
<td>Performs daily routine in highly familiar environment in non-confused but automatic robot-like manner; skills noticeably deteriorate in unfamiliar environment</td>
</tr>
</tbody>
</table>
“This is my shield.
I bear it before me into battle,
But it is not mine alone.
It protects my brother on my left.
It protects my city.
I will never let my brother
out of its shadow
nor my city out of its shelter.
I will die with my shield before me
facing the enemy.”

From: Steven Pressfield- “Gates of Fire”
The first targets in war are bridges. Let us view the threat (Global War on Terrorism) as an opportunity to strengthen our bridges between disciplines and communities.

“If the guardians fail, the democracy will crumble.” (From Plato’s Republic, 400 BC.)